

Supplementary Materials for

STAT3 Induction of miR-146b Forms a Feedback Loop to Inhibit the NF- κ B to IL-6 Signaling Axis and STAT3-Driven Cancer Phenotypes

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Published 28 January 2014, *Sci. Signal.* **7**, ra11 (2014)

DOI: 10.1126/scisignal.2004497

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Supplementary Materials

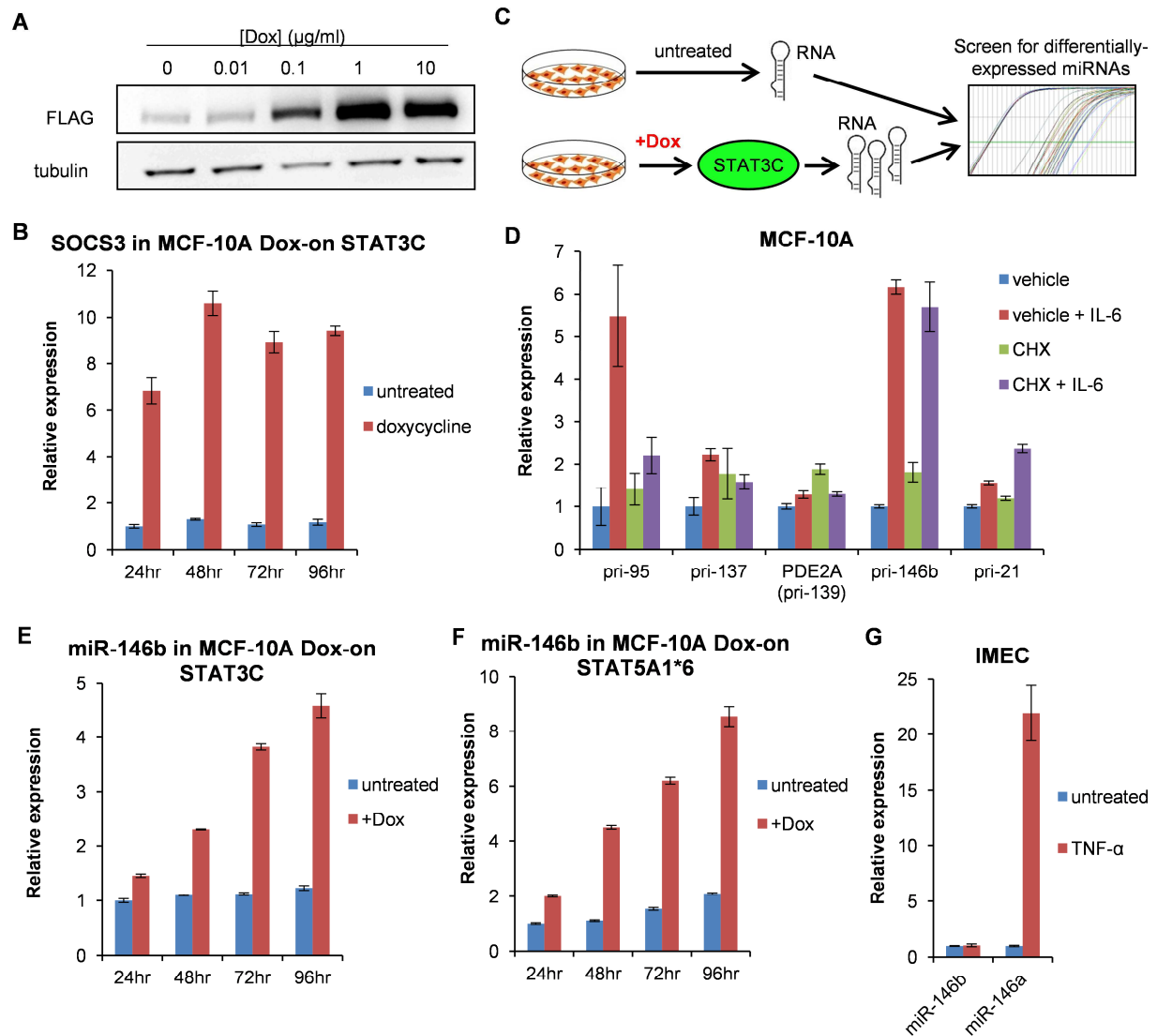


Fig. S1. Doxycycline-inducible cell systems for miRNA screening and analyses of miR-146b regulation. (A) Induction of FLAG-tagged STAT3C in doxycycline (Dox)-inducible cells after 24 hours. (B) Induction of *SOCS3*, a STAT3 target gene, in doxycycline-inducible cells after treatment with doxycycline (2 μg/ml) for 24-96 hours. (C) Screening strategy to identify STAT3-regulated miRNAs. (D) Analysis of direct and indirect STAT targets using the protein synthesis inhibitor cycloheximide (CHX) in MCF-10A cells pre-treated with vehicle or 2 μg/ml CHX for 1

hour, then stimulated with 20 ng/ml IL-6 for 2 hours. Primary transcripts of validated miRNA hits from the screen were analyzed by qRT-PCR. **(E-F)** MiR-146b expression in MCF10A cells transfected with Dox-inducible constitutively active STAT mutants (STAT3C and STAT5A1*6). **(G)** MiR-146a and miR-146b expression in immortalized mammary epithelial cells (IMECs) treated with TNF- α (10 ng/ml) for 48 hours. Data in (B) and (D) to (G) are means \pm SE of one of two independent experiments.

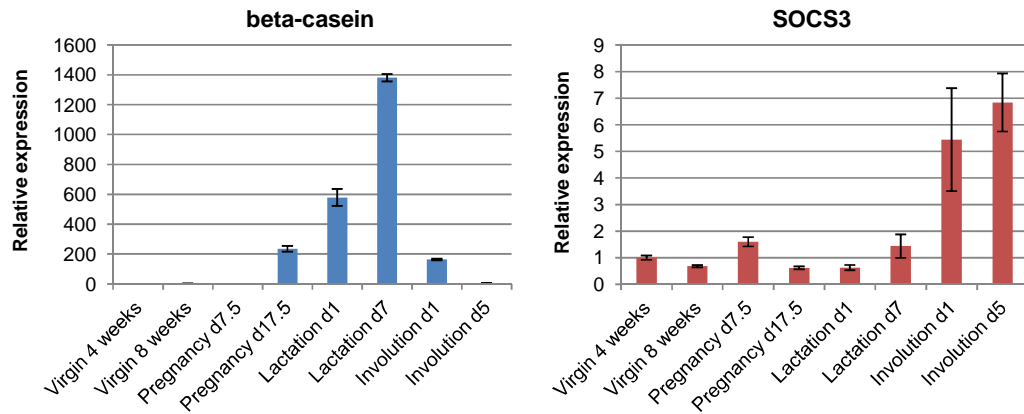


Fig. S2. STAT target gene expression across mouse mammary developmental stages. The gene *CASB*, which encodes beta-casein (left), is a STAT5 target, and *SOCS3* (right) is a STAT3 and STAT1 target. Data are means \pm SE of technical replicates from one mouse, representative of two mice.

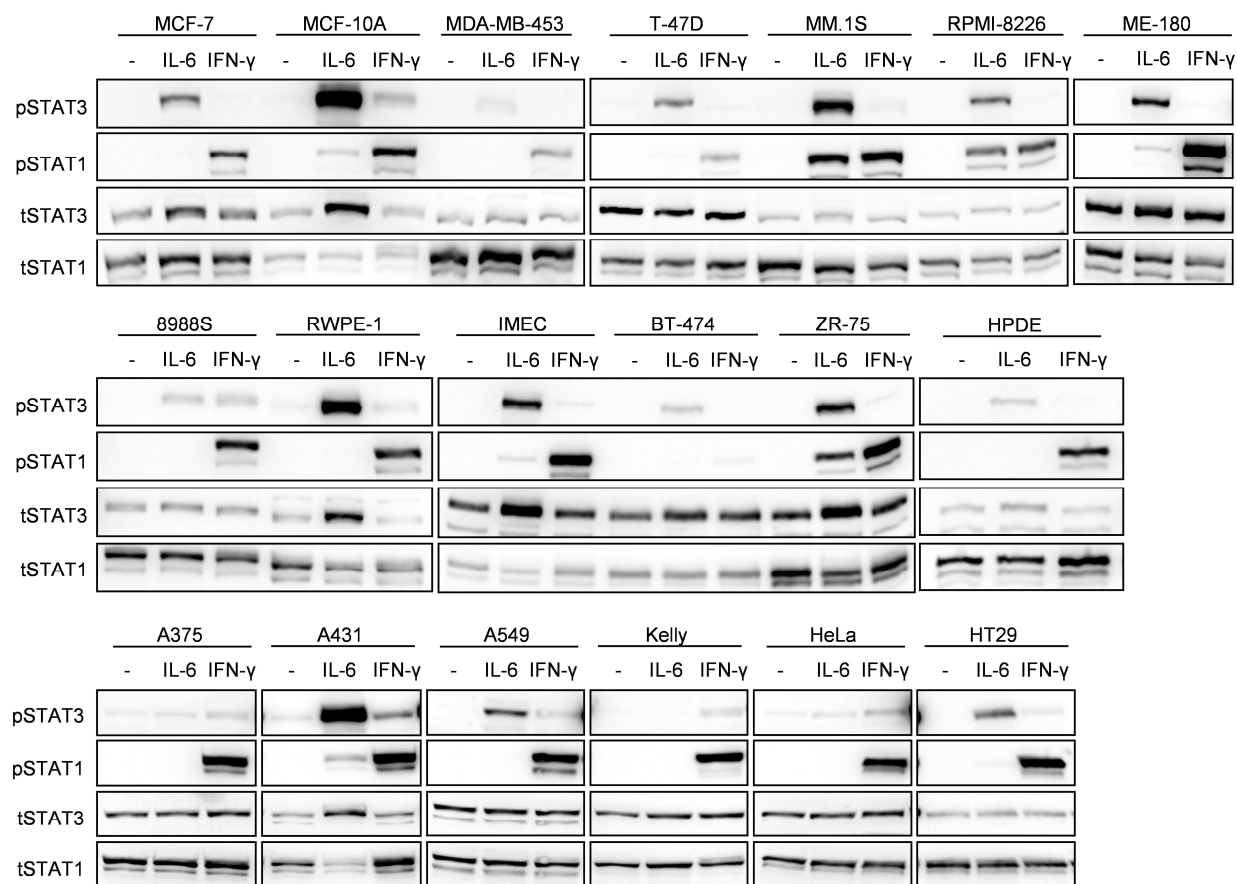


Fig. S3. Western blotting of cells after cytokine stimulation. STAT activation was induced in cells that lack basal STAT activation after treatment with IL-6 or IFN- γ (20 ng/ml) for 15 min. Immunoblotting was performed to detect phospho-tyrosine (p) STAT3 or STAT1 against total (t) STAT3 or STAT1. Data are representative of 2 experiments.

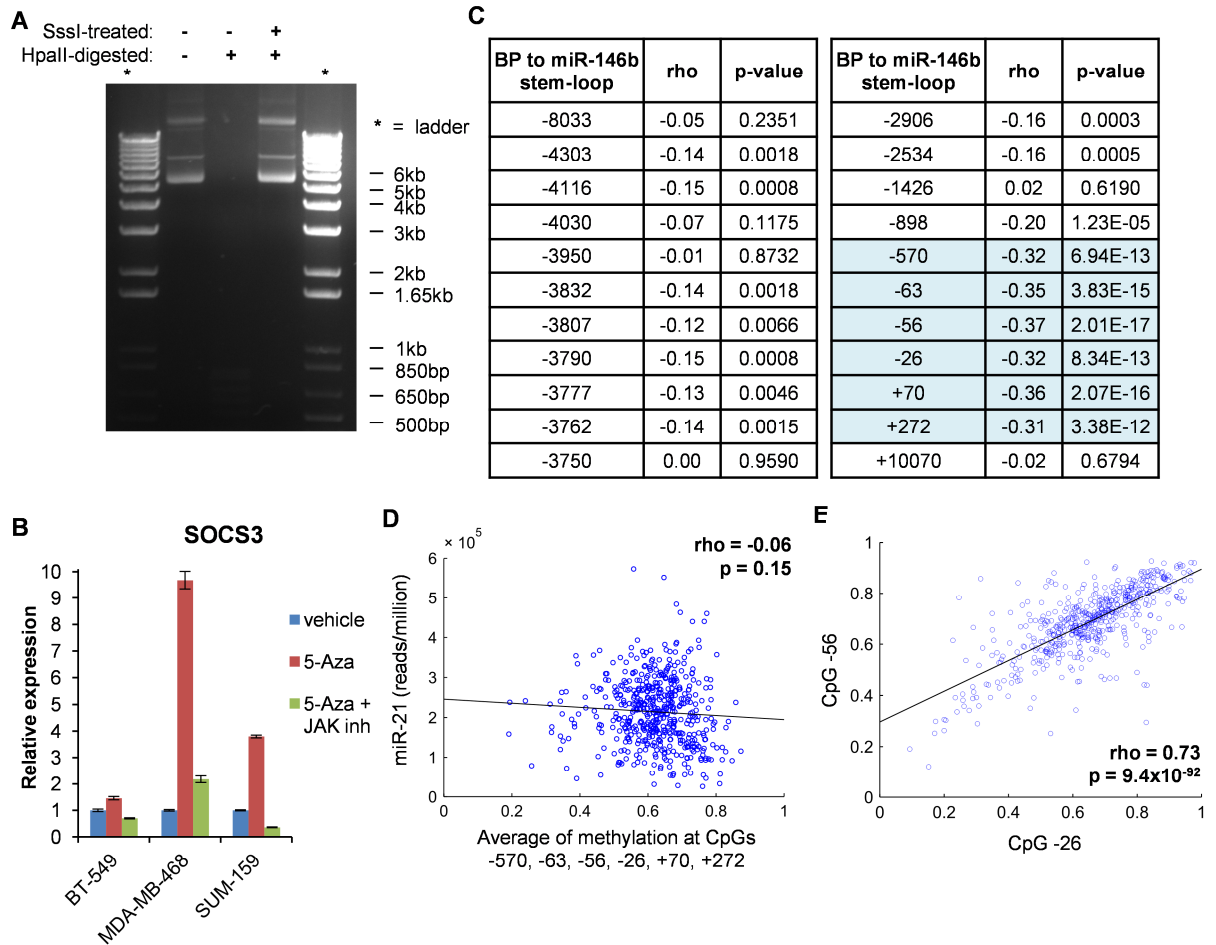


Fig. S4. Characterization of *miR-146b* promoter methylation. (A) SssI-treated plasmid DNA was resistant to digestion by methylation-sensitive HpaII restriction enzyme, providing verification of methylation. HpaII is a 4-base cutter and therefore the average fragment size is predicted to be 256 bp. This is below the size of the smallest fragments retained on the gel (500 bp, as indicated). (B) Analysis of *SOCS3* expression as in Fig. 3B. Data are means \pm SE of one of two independent experiments. (C) Correlation between miR-146b expression and extent of CpG methylation at 22 CpGs within 10 kb of *miR-146b* interrogated by Illumina 450k profiling in TCGA. Sites highlighted in blue indicate a highly significant inverse correlation. (D) Lack of correlation between CpG methylation at the miR-146b locus and miR-21 abundance in TCGA.

(E) Strong positive correlation between CpG sites near miR-146b, indicating coordinate regulation in this region in TCGA.

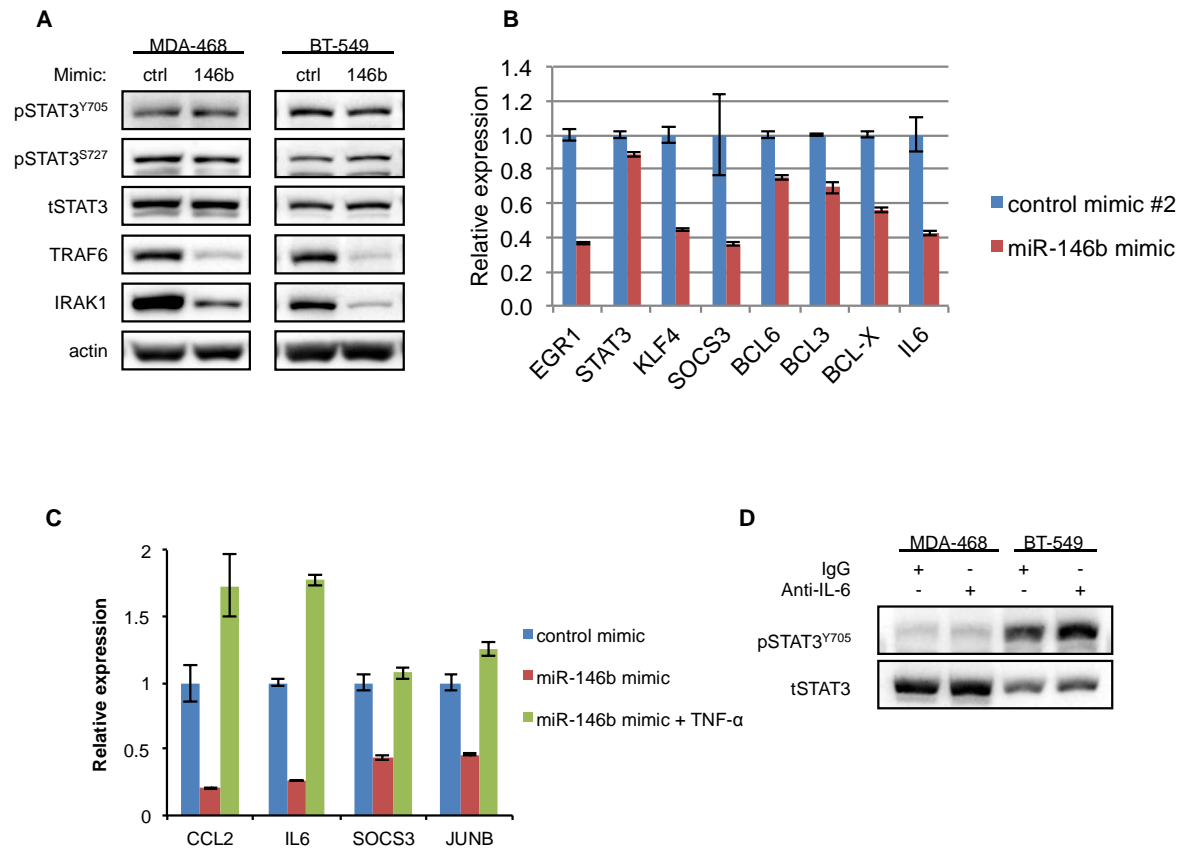


Fig. S5. Effects of miR-146b mimic and IL-6-neutralizing antibody on STAT3

phosphorylation and gene expression. (A) An immunoblot of breast cancer cells (MDA-MB-468 and BT-549) transfected with miR-146b or control mimic (25 nM) for 72 hours. (B) Expression of STAT3 target genes in MDA-MB-453 cells 72 hours after transfection with miR-146b mimic. (C) Expression of indicated NF-κB and STAT3 target genes in SUM-159 cells 72 hours after transfection with miRNA mimic alone or with concurrent TNF-α treatment. Data are means ± SE of one of 2 experiments. (D) An immunoblot of breast cancer cells (MDA-MB-468

and BT-549) treated with 3 µg/ml IL-6 neutralizing antibody or control IgG for 6 hours in fresh media. Data are representative of at least two independent experiments.

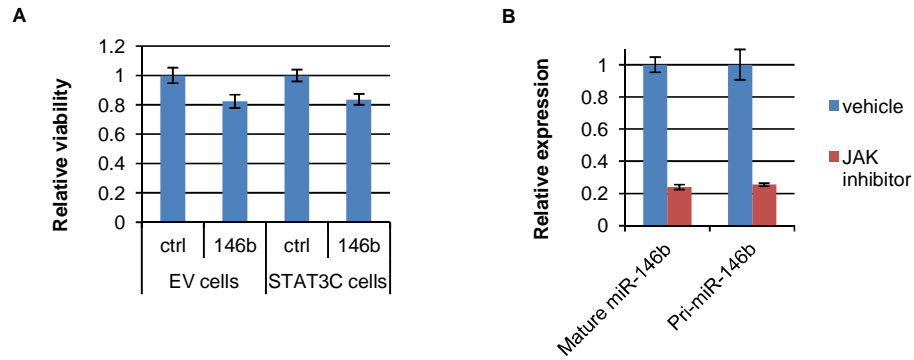


Fig. S6. Effect of miR-146b mimic and JAK inhibitor in SUM-159 cells. (A) Cell viability (as a measure of ATP) in SUM-159 cells transfected with miR-146b or control mimic (25 nM) for 48 hours, when the cells were also assessed motility, and using Cell Titer Glo. Data are mean \pm SD of 2 experiments. Data are mean \pm SD of three biological replicates. (B) Expression of mature miR-146b and *miR-146b* primary transcript analyzed by qRT-PCR in SUM-159 cells treated with JAK inhibitor 1 (1 μ M) for 72 hours. Data are means \pm SEM of one representative biological replicate from two independent experiments.

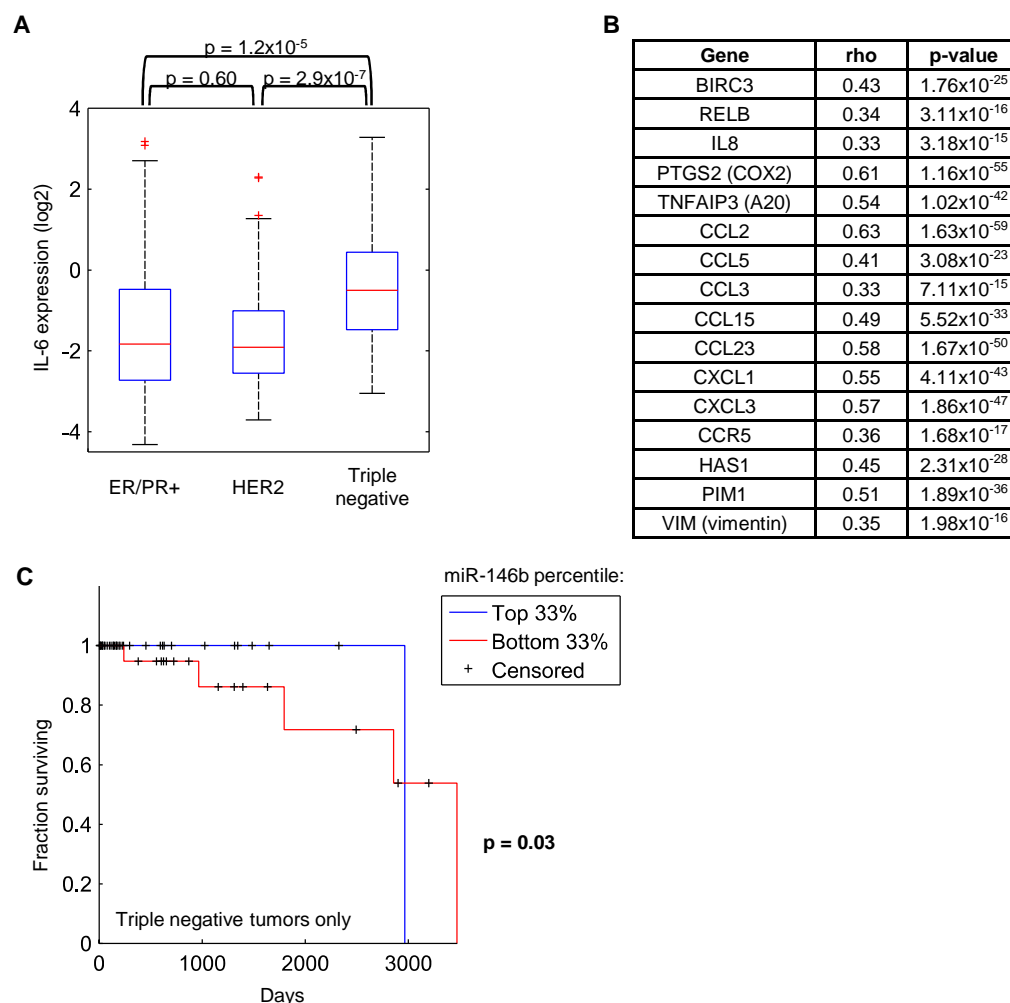


Fig. S7. Analysis of triple-negative tumors versus other molecular subtypes in TCGA

breast cancer cohort. (A) Analysis of *IL6* expression performed as in Fig. 7B, but comparing triple negative breast cancers to other molecular subtypes. (B) Correlation of IL-6 abundance with expression of the indicated NF- κ B target genes. (C) Survival analysis against miR-146b expression in patients as in Fig. 7C, but in the specific subset of triple negative breast cancers.

Table S1. Results of miRNA screen. Shown are ratios for each detected miRNA in doxycycline-induced MCF-10A cells compared to untreated cells. The housekeeping genes *RNU44* and *RNU48* were used for normalization. The raw data for the screen, which is deposited to GEO (GSE44089), consist of TaqMan qRT-PCR Ct values for each microRNA assayed, or no value/“Undetermined” if the microRNA was not detected within 40 cycles of amplification. Each condition was performed as a biological triplicate. Ct values greater than 30 are considered unreliable based on the experience of the profiling core, due to the large within-sample variation at this expression level.

<u>MicroRNA</u>	<u>Fold-change (average across all replicates)</u>	<u>Error bar (SD) of untreated replicates</u>	<u>Error bar (SD) of doxycycline replicates</u>
hsa-let-7a-4373169	1.05923534	0.121013342	0.046244094
hsa-let-7b-4395446	1.203151396	0.184324038	0.471774397
hsa-let-7c-4373167	1.166443934	0.130063542	0.153489908
hsa-let-7d-4395394	0.911932633	0.060095323	0.090465162
hsa-let-7e-4395517	0.929867245	0.193617933	0.126117145
hsa-let-7f-4373164	1.236089156	0.041612883	0.068205901
hsa-let-7g-4395393	1.337882077	0.019846699	0.173649407
hsa-miR-100-4373160	0.790125706	0.138525193	0.042943191
hsa-miR-101-4395364	1.0473067	0.037375168	0.159586387
hsa-miR-103-4373158	1.264856513	0.080079631	0.133276537
hsa-miR-106a-4395280	0.949819407	0.073552392	0.221274616
hsa-miR-106b-4373155	1.010104776	0.062567882	0.170223339
hsa-miR-107-4373154	1.177560438	0.125316866	0.11110021
hsa-miR-10a-4373153	1.151279536	0.300863389	0.305949667
hsa-miR-125a-3p-4395310	0.990785962	0.225971557	0.071256743
hsa-miR-125a-5p-4395309	1.100993175	0.189697581	0.068987258
hsa-miR-125b-4373148	0.992503427	0.099279799	0.078153509
hsa-miR-126-4395339	1.393397236	0.125660662	0.179338808
hsa-miR-128-4395327	1.071339441	0.155393462	0.130139065
hsa-miR-130a-4373145	1.314895174	0.074439695	0.466919894
hsa-miR-130b-4373144	1.109560187	0.044831039	0.230503032
hsa-miR-132-4373143	1.128693939	0.090337989	0.154211124
hsa-miR-135a-4373140	1.498783885	0.067210179	0.059160961
hsa-miR-135b-4395372	1.43722684	0.102184195	0.183283832
hsa-miR-137-4373301	1.883607825	0.147107974	0.432721662

hsa-miR-138-4395395	0.901491768	0.169022829	0.25866694
hsa-miR-139-5p-4395400	1.646827024	0.236468456	0.315140806
hsa-miR-140-3p-4395345	1.331389183	0.078970955	0.177310198
hsa-miR-140-5p-4373374	1.186393847	0.057808464	0.131403143
hsa-miR-141-4373137	1.066090115	0.095233764	0.095407114
hsa-miR-142-3p-4373136	0.639045052	0.601382154	0.186115516
hsa-miR-145-4395389	0.777250747	0.884698654	0.239453533
hsa-miR-146a-4373132	0.964723912	0.933622939	1.174544212
hsa-miR-146b-5p-4373178	3.761076715	0.146540021	0.061956687
hsa-miR-148a-4373130	1.255246448	0.029852845	0.16147226
hsa-miR-148b-4373129	1.075171952	0.085395535	0.224440334
hsa-miR-149-4395366	0.84489046	0.090842369	0.222752754
hsa-miR-150-4373127	0.156861915	0.332327391	0.04099871
hsa-miR-152-4395170	1.023199185	0.13940055	0.136904498
hsa-miR-15a-4373123	2.539994325	0.292666201	2.177512573
hsa-miR-15b-4373122	1.063326863	0.041659357	0.071074293
hsa-miR-16-4373121	1.201159833	0.095353964	0.155571651
hsa-miR-17-4395419	1.027244915	0.071076608	0.113302101
hsa-miR-181a-4373117	1.285999216	0.037503995	0.060323453
hsa-miR-181c-4373115	1.7016906	0.088944122	0.268189038
hsa-miR-182-4395445	1.273779178	0.156406281	0.143347763
hsa-miR-183-4395380	1.156773041	0.127965028	0.042545817
hsa-miR-185-4395382	1.011687372	0.093955859	0.187127985
hsa-miR-186-4395396	0.979812635	0.057046742	0.264174599
hsa-miR-18a-4395533	1.056658078	0.075873975	0.020115822
hsa-miR-18b-4395328	1.251366961	0.263409303	0.628546874
hsa-miR-190-4373110	1.658198689	0.205202694	0.805526329
hsa-miR-191-4395410	1.182376286	0.155515697	0.135773638
hsa-miR-192-4373108	0.942000828	0.141436261	0.213022939
hsa-miR-193a-3p-4395361	0.597349702	0.347563214	0.302768969
hsa-miR-193a-5p-4395392	1.139551862	0.098716497	0.185894091
hsa-miR-193b-4395478	1.004317165	0.263941145	0.120933583
hsa-miR-194-4373106	0.977974488	0.100124198	0.034135588
hsa-miR-195-4373105	1.073850917	0.166871641	0.095960429
hsa-miR-196b-4395326	0.972624367	0.146063981	0.188028418
hsa-miR-197-4373102	1.246260144	0.208821069	0.109950408
hsa-miR-19a-4373099	1.337681741	0.12672278	0.21533369
hsa-miR-19b-4373098	0.972773517	0.085569935	0.056794672
hsa-miR-200b-4395362	0.865122651	0.177247459	0.285558115
hsa-miR-200c-4395411	0.881712658	0.206388466	0.069096474
hsa-miR-203-4373095	0.928531138	0.093544237	0.037814256
hsa-miR-204-4373094	0.7806512	0.180135149	0.22787232
hsa-miR-205-4373093	0.831403867	0.128368572	0.037201354

hsa-miR-20a-4373286	1.12794962	0.086769984	0.103764201
hsa-miR-20b-4373263	0.870697169	0.145633902	0.088802958
hsa-miR-210-4373089	0.951411071	0.138668133	0.08363559
hsa-miR-212-4373087	1.264899686	0.180613238	0.279259796
hsa-miR-21-4373090	1.803431889	0.051898652	0.291426972
hsa-miR-215-4373084	1.586317012	0.108605895	0.608037346
hsa-miR-218-4373081	0.892613014	0.061753867	0.124094571
hsa-miR-219-1-3p-4395206	1.061651488	0.428746955	0.166791718
hsa-miR-221-4373077	0.987909978	0.017154296	0.089082144
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hsa-miR-22-4373079	1.795281591	0.334473018	0.379653371
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hsa-miR-590-5p-4395176	1.117758905	0.062843551	0.206723229
hsa-miR-597-4380960	1.520650363	0.12242481	0.412993464
hsa-miR-598-4395179	0.998389077	0.020699954	0.182390676
hsa-miR-625-4395542	1.248252844	0.119207565	0.07059951
hsa-miR-628-5p-4395544	1.17477057	0.23138161	0.320391986
hsa-miR-629-4395547	0.979048279	0.257364977	0.289164228
hsa-miR-636-4395199	1.807517879	0.188073602	0.607984353
hsa-miR-642-4380995	1.497065681	0.168625042	0.287941754
hsa-miR-652-4395463	0.955643296	0.149474252	0.070535325
hsa-miR-655-4381015	2.490542514	0.444131123	1.02210061
hsa-miR-660-4380925	1.104002031	0.028767568	0.063259236
hsa-miR-671-3p-4395433	1.219142116	0.048731792	0.243297732
hsa-miR-708-4395452	0.961601655	0.051956088	0.138144707
hsa-miR-744-4395435	1.080202189	0.095001202	0.165361203
hsa-miR-885-5p-4395407	1.151852744	0.040998762	0.217205774
hsa-miR-886-5p-4395304	0.867564417	0.406148691	0.217674942
hsa-miR-888-4395323	0.935632295	0.239884038	0.457565105
hsa-miR-891a-4395302	1.782648767	0.430865886	0.402756587
hsa-miR-92a-4395169	1.058160125	0.042582046	0.141060056
hsa-miR-93-4373302	1.066595997	0.13462088	0.056968767
hsa-miR-9-4373285	1.189253685	0.286501955	0.22291041
hsa-miR-95-4373011	8.733594731	0.123972434	0.617553087
hsa-miR-96-4373372	1.031921919	0.023953873	0.057612074
hsa-miR-98-4373009	1.193956494	0.645001391	0.585260542

hsa-miR-99a-4373008	0.877631877	0.231066803	0.0821659
hsa-miR-99b-4373007	1.101309243	0.211238544	0.052983824
dme-miR-7-000268	0.918530514	0.269633635	0.32532514
hsa-let-7e#-002407	0.707589897	1.205973407	0.123751492
hsa-let-7f-1#-002417	0.671222399	0.546854459	0.20399079
hsa-let-7f-2#-002418	0.971847121	0.034829046	0.069569225
hsa-miR-100#-002142	0.787505254	0.227164623	0.207664423
hsa-miR-106b#-002380	1.125850909	0.238784839	0.352768206
hsa-miR-1180-002847	0.84914856	0.269413205	0.076594097
hsa-miR-1201-002781	1.040872031	0.327450049	0.236292229
hsa-miR-1226#-002758	2.067774267	0.379200744	0.080883154
hsa-miR-1227-002769	0.689179012	0.495664298	0.462294939
hsa-miR-1233-002768	1.015372822	0.355357874	0.04651525
hsa-miR-1243-002854	0.43196488	0.260221992	0.152031625
hsa-miR-1244-002791	0.837984572	0.194661136	0.081664068
hsa-miR-1254-002818	0.835646511	0.400072437	0.080030706
hsa-miR-1255B-002801	1.127296889	0.378228949	0.282594644
hsa-miR-125b-1#-002378	1.312039392	0.086547677	0.289147735
hsa-miR-126#-000451	1.058997274	0.298923486	0.068735518
hsa-miR-1260-002896	1.143872925	0.108391039	0.210670093
hsa-miR-1274A-002883	1.013718484	0.112664002	0.190751881
hsa-miR-1274B-002884	1.069401466	0.137486526	0.286376568
hsa-miR-1275-002840	0.97378223	0.132793693	0.183421636
hsa-miR-1276-002843	1.430723034	0.169683555	0.705879041
hsa-miR-1282-002803	1.79668691	1.349657829	1.031482578
hsa-miR-1285-002822	1.290130342	0.073470256	0.19686936
hsa-miR-1290-002863	0.613735089	0.279892196	0.265847353
hsa-miR-1293-002905	1.800302382	0.993406277	0.73317643
hsa-miR-1300-002902	0.773841173	0.314507137	0.375497231
hsa-miR-1303-002792	0.684836184	1.286464588	0.20293871
hsa-miR-1305-002867	0.960726418	0.305707228	0.39599538
hsa-miR-130b#-002114	0.591420685	0.138621275	0.098264246
hsa-miR-135b#-002159	1.051639146	0.343724753	0.845227691
hsa-miR-148b#-002160	1.086998037	0.212279107	0.266766805
hsa-miR-151-3p-002254	1.15130642	0.159992094	0.195280755
hsa-miR-151-5P-002642	1.012682584	0.085627935	0.15280991
hsa-miR-15a#-002419	1.00941413	0.100571489	0.197566979
hsa-miR-15b#-002173	1.155926168	0.075885416	0.026245031
hsa-miR-16-1#-002420	1.257929015	0.205608264	0.056286549
hsa-miR-17#-002421	0.730273645	0.153161055	0.300440903
hsa-miR-181a-2#-002317	2.05286254	0.141989825	0.074737267
hsa-miR-183#-002270	1.312620082	0.156563538	0.261132401
hsa-miR-18a#-002423	0.996516392	0.216368518	0.093105414

hsa-miR-190b-002263	0.620400638	0.187896726	0.087847771
hsa-miR-191#-002678	1.189147841	0.187702116	0.236572073
hsa-miR-192#-002272	1.248521628	0.400876163	0.153652409
hsa-miR-193b#-002366	1.372001114	0.196364808	0.155563928
hsa-miR-19a#-002424	1.284269413	21.09409843	30.8567531
hsa-miR-19b-1#-002425	1.064158176	0.19325163	0.107264611
hsa-miR-206-000510	1.158540218	0.178767422	0.452645613
hsa-miR-20a#-002437	0.870075839	0.01541082	0.13011443
hsa-miR-21#-002438	2.33491386	0.129622945	0.230771683
hsa-miR-213-000516	0.95936653	0.082087437	0.183555392
hsa-miR-22#-002301	1.649959064	0.073475834	0.178278838
hsa-miR-222#-002097	0.929102553	0.106237084	0.07073513
hsa-miR-23a#-002439	0.378416837	0.969204197	0.101699259
hsa-miR-24-2#-002441	1.296558525	0.068863611	0.296392892
hsa-miR-25#-002442	0.665748947	0.608990618	0.531371766
hsa-miR-26a-1#-002443	0.990562702	0.083979441	0.273970784
hsa-miR-26a-2#-002115	1.033344128	17.39160988	4.731727855
hsa-miR-26b#-002444	0.846293963	0.214354011	0.101908118
hsa-miR-27a#-002445	0.96445246	0.13228976	0.067799056
hsa-miR-27b#-002174	0.767098776	0.069785608	0.060601549
hsa-miR-29a#-002447	1.030277978	0.275796257	0.163525244
hsa-miR-29b-1#-002165	0.967499923	0.420833401	0.507445826
hsa-miR-29b-2#-002166	0.324379513	3.529143698	0.281414517
hsa-miR-30a-3p-000416	0.992718022	0.232685324	0.067455181
hsa-miR-30a-5p-000417	1.065538037	0.116954432	0.121766051
hsa-miR-30d#-002305	0.951982782	0.16583336	0.334970464
hsa-miR-30d-000420	0.817283619	0.027834021	0.089292406
hsa-miR-30e-3p-000422	0.843204982	0.118342471	0.048995205
hsa-miR-31#-002113	0.874468154	0.125827009	0.073728256
hsa-miR-320B-002844	0.975603006	0.089171159	0.114045789
hsa-miR-335#-002185	0.674956576	0.55246784	0.150389
hsa-miR-338-5P-002658	0.757600659	0.758946587	0.307378319
hsa-miR-33a#-002136	0.970321972	0.113952797	0.206845633
hsa-miR-340#-002259	0.941250971	0.142094391	0.081273882
hsa-miR-34a#-002316	0.93376856	0.133132877	0.120189866
hsa-miR-34b-000427	0.296193335	1.541791231	0.679046344
hsa-miR-34b-002102	0.737452092	0.176900456	0.08550871
hsa-miR-374a#-002125	1.158683447	0.299208167	0.746191223
hsa-miR-378-000567	0.937151308	0.454602928	0.259994542
hsa-miR-378-002243	0.684716133	0.108196472	0.260203319
hsa-miR-409-3p-002332	1.130152313	0.130124764	0.119461965
hsa-miR-425#-002302	1.016500949	0.155693328	0.187733453
hsa-miR-454#-001996	1.170637137	0.108202042	0.084887972

hsa-miR-497-001043	2.000925369	1.093358736	2.69050525
hsa-miR-505#-002087	1.075505969	0.206861951	0.276507961
hsa-miR-516-3p-001149	0.834841122	0.062901808	0.221224468
hsa-miR-520c-3p-002400	0.78870436	0.395998991	0.549272226
hsa-miR-520D-3P-002743	0.653501146	0.391936522	0.071941985
hsa-miR-545#-002266	0.88432705	0.30211098	0.716973699
hsa-miR-550-001544	2.101341234	0.196598941	1.160839433
hsa-miR-550-002410	0.822544422	0.082103846	0.302483614
hsa-miR-577-002675	0.881529998	0.015033879	0.171487191
hsa-miR-584-001624	1.557727747	0.132738741	0.780265006
hsa-miR-589-001543	1.312014634	0.15178406	0.239908919
hsa-miR-590-3P-002677	0.902096623	0.079157141	0.070930209
hsa-miR-601-001558	1.026719694	0.12780672	0.196921328
hsa-miR-616-001589	0.862490658	0.558360626	0.608571285
hsa-miR-624-001557	1.167896863	3.282094606	4.865833439
hsa-miR-625#-002432	0.944988547	0.104239233	0.062134728
hsa-miR-628-3p-002434	5.936814058	0.306915836	4.585470673
hsa-miR-629-001562	0.969554019	0.029826068	0.233428862
hsa-miR-638-001582	0.855474904	0.585545062	0.302210895
hsa-miR-641-001585	0.148758982	0.29680403	0.220810921
hsa-miR-645-001597	0.790875334	1.567059283	1.440596594
hsa-miR-664-002897	1.691098033	0.218685636	0.341023091
hsa-miR-720-002895	1.152873544	0.124538686	0.094649928
hsa-miR-744#-002325	1.187826089	0.170950062	0.142615964
hsa-miR-766-001986	1.740582204	0.409575738	0.07823714
hsa-miR-769-5p-001998	0.897400507	0.132830996	0.02662452
hsa-miR-875-5p-002203	1.023043527	0.444594954	0.390400611
hsa-miR-9#-002231	0.567408978	0.228214758	0.146191587
hsa-miR-92a-1#-002137	0.794739664	0.591285611	0.181916448
hsa-miR-93#-002139	0.976505442	0.181064197	0.076968853
hsa-miR-941-002183	1.111498339	0.091466517	0.202581597
hsa-miR-942-002187	0.922488437	0.106237402	0.077925711
hsa-miR-944-002189	0.805190856	0.157860956	0.138784668
hsa-miR-99a#-002141	3.174376509	0.920684665	2.688694142
hsa-miR-99b#-002196	1.030291372	0.107571139	0.087697417
rno-miR-29c#-001818	1.186120788	0.161946507	0.159033891
rno-miR-7#-001338	1.061386942	0.056859089	0.116585736

Table S2: Primers for qRT-PCR. Sequences of the primers used for each gene are listed.

18S rRNA	5'-GTAACCCGTTGAACCCCAT-3' 5'-CCATCCAATCGGTAGTAGCG-3'
Beta actin	5'-TCCCTGGAGAAGAGCTACGA-3' 5'-AGCACTGTGTTGGCGTACAG-3'
Pri-miR-146b	5'-ATTCAGGGTTTTGGGGAGAT-3' 5'-GGGGCTTTCTGAGCTAAAGG-3'
STAT3	5'-ACCGGCGTCCAGTTCACTACT-3' 5'-CCGGGATCCTCTGAGAGCTGC-3'
SOCS3	5'-TCAAGACCTTCAGCTCCAAG-3' 5'-TGACGCTGAGCGTGAAGAAG-3'
BIRC3	5'-GGGAAGAGGAGAGAGAAAGAGC-3' 5'-TCCAGGATTGGAATTACACAAG-3'
NFKB2	5'-AGAGGGAGGAGGGCCTTTAG-3' 5'-CAGGTTCTGCTTCCCAGAAT-3'
RELB	5'-AGCATCCTTGGGGAGAGC-3' 5'-AGGCAGTCACCTCCACCTC-3'
IKBα	5'-ACGAGCAGATGGTCAAGGAG-3' 5'-CTTCCATGGTCAGTGCCTTT-3'
A20	5'-CCTTGGAAGCACCATGTTTG-3' 5'-TTGTGTGGTTCGAGGCACAT-3'
CCL2	5'-TGCCCCAGTCACCTGCTGTT-3' 5'-CCCACTTCTGCTTGGGGTCAGC-3'
IL6	5'-GAAAGCAGCAAAGAGGCACT-3' 5'-TTTCACCAGGCAAGTCTCCT-3'
RELA	5'-CCACGAGCTTGTAGGAAAGG-3' 5'-CTGGATGCGCTGACTGATAG-3'
JUNB	5'-AAATGGAACAGCCCTTCT-3' 5'-TGTAGAGAGAGGCCACCA-3'
MCL1	5'-GAGACCTTACGACGGGTT-3' 5'-TTTGATGTCCAGTTTCCG-3'
EGR1	5'-AGCCCTACGAGCACCTGAC-3' 5'-AGCGGCCAGTATAGGTGATG-3'
KLF4	5'-TCCCATCTTTCTCCACGTTC-3'

	5'-AGTCGCTTCATGTGGGAGAG-3'
BCL6	5'-CTGCAGATGGAGCATGTTGT-3' 5'-TCTTCACGAGGAGGCTTGAT-3'
BCL3	5'-CCTCTGGTGAACCTGCCTAC-3' 5'-TACCCTGCACCACAGCAATA-3'
BCL-X	5'-GGTATTGGTGAGTCGGATCG-3' 5'-TGCTGCATTGTTCCCATAGA-3'
E-cadherin	5'-CCTGGGACTCCACCTACAGA-3' 5'-TGTGAGCAATTCTGCTTGGA-3'
Desmoplakin	5'-GGCACCAGCAGGATGTACT-3' 5'-ATCAAGCAGTCGGAGCAGTT-3'
Vimentin	5'-TCAGAGAGAGGAAGCCGAAA-3' 5'-ATTCCACTTTGCGTTCAAGG-3'
Cadherin-11	5'-CAACGGACTATGAAACACAGGA-3' 5'-GAAAGGGCCATTGCTGATAA-3'
Slug	5'-TCGGACCCACACATTACCTT-3' 5'-TGACCTGTCTGCAAATGCTC-3'